

# Role of North America and AANS in Global Neurosurgery

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"The sons of Adam are limbs of each other,  
having been created of one essence.  
When the calamity of time affects one limb, the other limbs cannot remain at rest.  
If thou hast no sympathy for the troubles of others,  
thou art unworthy to be called by the name of a human."  
Saadi Shirazi, a Persian poet.

## 1 | INTRODUCTION

Approximately 28% of the global burden of disease is surgical (1). There is an estimated deficit of 90,909 neurosurgeons globally, who must care for an additional 14 million neurosurgical patients annually (2). In a study published by Alkire et al. on global access to surgical care, it was revealed that approximately two-thirds of the world's population, comprising 4.8 billion people, do not have access to timely, affordable, or safe surgical care. The study also concluded that 99.3% of Lower-Income Countries (LICs) and 96.7% of Lower Middle-Income Countries (LMICs) populations do not have access to safe surgery (3). Historically, global health policies focused on specific issues like access to healthcare and outcomes of infectious disease treatment and vaccinations. In January 2014, the Lancet Commission on Global Surgery (LCoGS), headed by healthcare leaders from 111 countries, gathered in Boston to research and propose strategies to improve surgery access globally. One of the committee's goals was to bring surgeons from different socio-economic strata under one roof to facilitate collaboration and fruitful exchange of ideas. The committee also motivated the higher-income countries of North America to collaborate and shrink the existing hiatus in surgical access present in lower and middle-income countries (4). Since then, significant progress has been achieved in this regard under the leadership of North American academic institutes, neurosurgical societies, non-governmental organizations (NGOs), and even individual surgeons (1,5).

The LCoGS defined the universal access to Safe, Affordable, and timely (Fast) surgery (Excision) and anesthesia as their core vision for global surgery (can be remembered by the acronym SAFE) (3,4). In the realm of neurosurgery, the global surgery movement has been gaining considerable momentum over the last few years, especially after the Lancet Commission Report and the WHO's newly adopted resolution of "Strengthening Emergency and Essential Surgical and Anesthesia Care as a Component of Universal Health Coverage" under the leadership of Dr. Walter Johnson World Health Assembly Resolution (WHA) (6).

## 2 | GLOBAL NEUROSURGERY EDUCATION AND RESEARCH

Canada and many European countries were actively involved in international health affairs long before the active participation of North America. Inspired by these efforts, in 1958, the American Association of Neurological Surgeons (AANS) began sending neurosurgeons aboard the SS HOPE (Health Opportunity for People Everywhere), a 235-bed US Navy hospital ship dedicated to providing healthcare to remote regions of the globe (7). Later realizing the need for long-term sustainable development of neurosurgical care in low-resource countries, the AANS ad hoc committee proposed establishing the Foundation of International Education in Neurological Surgery (FIENS) in 1969. The FIENS had a singular focus of exchanging knowledge, experience, and surgical techniques with low resource countries; this has further created many fellowships and hands-on training opportunities for neurosurgeons in these countries (7). In line with the goals of FIENS, the Department of Neurosurgery at Rutgers University annually sponsors two fully paid research fellowships for medical graduates and trained neurosurgeons from LMICs.

The AANS has also worked diligently over the last decade to provide online, freely accessible educational resources to advance neuroanatomy and neurosurgery knowledge across the world. 'The Rhoton Collection' is a seminal contribution to neurosurgery, a world-class online project to disseminate surgical anatomy education through AANS and Journal of Neurosurgery (JNS) collaboration (8). Another significant contribution is The Neurosurgical Atlas, an online collection of text, illustrations, intraoperative images, and videos created under the leadership of Dr. Aaron Cohen-Gadol in partnership with the AANS and leading neurosurgical journals as an effort to advance neurosurgical education and technique worldwide.

University hospitals in North America are at the forefront of the global neurosurgical mission. Duke University, Weill Cornell Medicine, and Barrow Neurological Institute, to name a few, have made significant contributions to advancing education and neurosurgery global health (9). On a similar front, the Global Neurosurgery Initiative (GNI) of the Program in Global Surgery and Social Change (PGSSC) at Harvard Medical School focuses on research, health policy, health economics, and advocacy realm of global neurosurgery. In collaboration with the WFNS and the National Institute for Health Research (NIHR) international health group, the GNI has evaluated the neurosurgical burden in LMIC's (10). The annual case deficit is approximately 2 million in the WHO's African region and 2.5 million in the WHO's Southeast Asian region (10); this quantification is essential to grasping the extent to which the neurosurgical task worldwide insufficiency, in turn, creates a metric to measured progress and tracking.

Another prominent contribution of North American institutions to global neurosurgery is within the avenue of research; findings from global surgery research highlight the disparities in surgical care, instrumental in guiding informed policymaking. In that regard, many web platforms have been established to promote international research collaboration. One such platform is 'InciSiON,' an international network run by medical students, residents, and doctors worldwide, contributing substantially to international global surgery studies through the organized integration of data (11). InterSurgeon is another web platform conceived by two pediatric neurosurgeons - William Harkness from the UK and Jim Johnston from America - to facilitate communication between surgeons worldwide to develop collaborative partnerships to assist with clinical care and teaching training programs and the provision of surgical equipment (12).

### **3 | GLOBAL NEUROSURGERY MEETINGS**

Educational institutes in North America regularly host global neurosurgical symposiums. During the Covid era, these symposiums have taken free, virtual interactive sessions and bring neurosurgeons worldwide to understand the disease burden, unmet needs, assess surgical access gaps, and the strategies to reduce them as the challenges to implementing such strategies. It also gives residents and neurosurgeons of LMIC's, and LIC's the opportunity to understand the advanced health practices and successful strategies implemented across the world, which paves the way to collaborate with existing initiatives and institutions to replicate those practices in their home settings. To promote such interaction and exchange of ideas, we at Rutgers University and RWJ Barnabas Health organized the virtual symposium "Global Neurosurgery: Ask Not for Whom the Bell Tolls." The event was held from September 10-12, 2020, run under the World Federation of Neurological Surgeons (WFNS). The meeting was designed as a neurosurgical colloquium intended to educate, innovate, and foster a deeper understanding of Global Neurosurgery and amassed an audience of more than 1,040 participants worldwide. The event featured nearly 200 speakers from across 38 countries, presented a vast variety of neurosurgical topics focused on global neurosurgery and education (figure 1). Separate sessions were conducted each day to encourage medical student and resident participation all over the world. The symposium was streamed online and reached more than 40,000 people on the social media platform Facebook Live (figure 2).

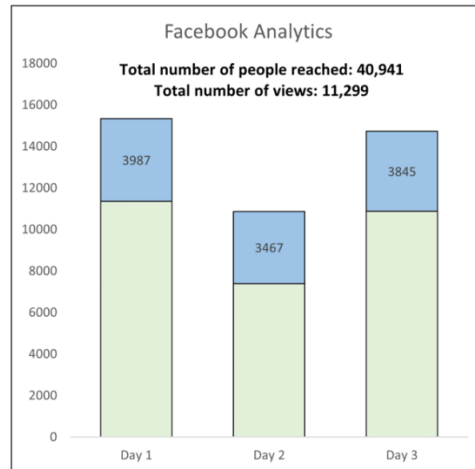
### **4 | NGOS AND MEDICAL DEVICE COMPANIES**

Robert Pierce (1914–1978), an American Baptist minister, founded a religious charity organization, Samaritan's Purse, in 1970, which is actively involved in providing surgical treatment for hydrocephalus (13). Similarly, NGOs like the Bill and Melinda Gates Foundation, the Conrad N. Hilton Foundation, International Medical Corporation, Doctors without Borders, and others are working in this direction (14). Many NGOs and medical device companies collaborate with the neurosurgeons and hospitals in LMIC's to understand the local needs and build or provide equipment accordingly. Medical device companies like NuVasive actively deliver spine care and education by conducting many medical camps through the NuVasive spine foundation (10).

A significant portion of the surgical burden in LMIC's is in rural areas as there is an unequal distribution of resources within each country. Collaboration with a major hospital or an academic institute located in urban areas may not adequately relieve the surgical access burden. Building infrastructure and donating equipment is a temporary solution as the maintenance also bears the cost. Therefore, we should be focusing on the development of sustainable plans to address these concerns. We must endeavor to strengthen the workforce behind surgical care and anesthesia. Many challenges exist due to underlying systemic issues such as local cultural and geopolitical preferences. However, I hope that we are in the right direction and that further research addressing these issues will be fruitful with North American organizations and the government's active participation. The Journal of Global Neurosurgery is a culmination of such an effort and will surely accelerate the Global Neurosurgery movement.

United States	Mexico
Algeria	Morocco
Argentina	Netherlands
Australia	Norway
Brazil	Pakistan
Canada	Phillipene
China	Romania
Columbia	Rwanda
Costa Rica	Saudia Arabia
Croatia	Serbia
Czech	South Africa
Egypt	Spain
Germany	Sweden
India	Switzerland
Indonesia	Turkey
Iran	United Arab Emirates
Ireland	United Kingdom
Italy	Uruguay
Japan	Zambia

**FIGURE 1.** Countries that participated.



**FIGURE 2.** Facebook analytics.

**REFERENCES**

1. Shrime MG, Sleemi A, Ravilla TD. Charitable platforms in global surgery: a systematic review of their effectiveness, cost-effectiveness, sustainability, and role training. *World J Surg.* 2015;39(1):10-20.
2. Corley JA, Haglund M. Letter: How Neurosurgery Fits into the Global Surgery 2030 Agenda. *Neurosurgery.* 2016;79(4): E544-545.
3. Alkire BC, Raykar NP, Shrime MG, et al. Global access to surgical care: a modeling study. *Lancet Glob Health.* 2015;3(6): e316-323.
4. Meara JG, Leather AJ, Hagander L, et al. Global Surgery 2030: evidence and solutions for achieving health, welfare, and economic development. 2015;386(9993):569-624.
5. Rutka JT. Editorial. Global neurosurgery and our social responsibility. *J Neurosurg.* 2019;130(4):1050-1052.
6. Price R, Makasa E, Hollands M. World Health Assembly Resolution WHA68.15: "Strengthening Emergency and Essential Surgical Care and Anesthesia as a Component of Universal Health Coverage"—Addressing the Public Health Gaps Arising from Lack of Safe, Affordable and Accessible Surgical and Anesthetic Services. *World J Surg.* 2015;39(9):2115-2125.
7. Mosberg WH, Jr. Foundation for international education in neurological surgery, incorporated. *J Neurosurg.* 1970;33(5):481-

484.

8. RutkaJTJJon. Mastering the art of complex neurosurgical procedures: The Neurosurgical Atlas and the Journal of Neurosurgery. 2017;126(4):1029-1032.
9. Dewan MC, Rattani A, Fieggen G, et al. Global neurosurgery: the current capacity and deficit in the provision of essential neurosurgical care. Executive Summary of the Global Neurosurgery Initiative at the Program in Global Surgery and Social Change. J Neurosurg. 2018:1-10.
10. Haglund MM, Fuller AT. Global neurosurgery: innovators, strategies, and the way forward. J Neurosurg. 2019;131(4):993-999.
11. Vervoort D, Bentounsi Z. InciSioN: Developing the Future Generation of Global Surgeons. Journal of surgical education. 2019;76(4):1030-1033.
12. Lepard JR, Akbari SHA, Haji F, Davis MC, Harkness W, Johnston JM. The initial experience of InterSurgeon: an online platform to facilitate global neurosurgical partnerships. Neurosurgical focus. 2020;48(3): E15.
13. Vanderlinden RG, Chisholm LDJJon. Vitreous hemorrhages and sudden increased intracranial pressure. 1974;41(2):167-176.
14. Cheatham ML. Bringing neurosurgical and neurological care to the world. Surg Neurol Int. 2013; 4:143-143